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*Original Paper*

# The U.S. Refrigerated Orange Juice Market: A Competitive Profile

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***Abstract***

*Porter links high market share with cost leadership strategy which is based on the idea of competing on a price that is lower than that of the competition. But, customer-perceived quality—not low cost—should be the foundation of competitive strategy, because it is far more vital to long-term competitive position and profitability than any other factor. So, a superior alternative is to offer better quality vs. the competition.*

*In most consumer markets a business seeking market share leadership should try to serve the middle class by competing in the mid-price segment; and offering quality better than that of the competition: at a price somewhat higher, to signify an image of quality, and to ensure that the strategy is both profitable and sustainable in the long run.*

*Quality, however, is an intricate concept consumers generally find difficult to understand. So, they often use relative price and a brand's reputation as a symbol of quality.*

*Total U.S. Refrigerated Orange Juice retail sales for 2008 were $2.6 Billion. There were ten package sizes ranging all the way from 6 oz to 128 oz. Of these the 64- and 59-oz size captured about two-thirds of the market at 66%.*

*It is a very competitive market with 142 brands in 2008. However, we have focused analysis on 32 brands whose 64oz- or 59oz-pack sales were over $1Million.*

*We tested two hypotheses: (1) That a market leader is likely to compete in the mid-price segment, and (2) That the unit price of the market leader is likely to be somewhat higher than that of the nearest competition. Employing U.S. retail sales data for 2008 and 2007, we found that the results supported both hypotheses for 2008, as well as 2007.*

*We also found strong support for the idea, that relative price is a strategic variable.*

*We compared the results of this project with four similar studies: the U.S. Men's Shaving Cream market,*

*the U.S. Beer market, the U.S. Shampoo market, and the U.S. Shredded/Grated Cheese market. We found the results to be very similar, indicating a pattern emerging for consumer markets.*

*Finally, we discovered five strategic groups in the industry.*

***Keywords***

*U.S. Refrigerated Orange Juice Market, cost leadership, price-quality segmentation, market-share leadership, relative price a strategic variable, strategic groups*

## 1. Introduction

This work follows the paths of four studies: the U.S. Men's Shaving Cream, the U.S. Beer, the U.S. Shampoo, and the U.S. Shredded/Grated Cheese markets (Datta, 2012, 2017, 2018a, 2018b). That research is based on the premise that the way to market share leadership does not lie in lower price founded in *cost leadership* strategy, as Porter (1980) suggests. Rather, it is based on the idea—according to the PIMS (Note 1) database research—that it is *customer*-perceived quality that is crucial to long-term competitive position and profitability. So, the answer to market share leadership for a business is to differentiate itself by offering quality that is *better* than that of the nearest competition (Datta, 2010a, 2010b, 2012, 2017, 2018a, 2018b).

To make this idea *operational* requires two steps. The first step is to determine which price-quality segment to compete in? Most consumer markets can be divided in three *basic* price-quality segments: *premium*, *mid-price*, and *economy*. These can be extended to five by adding two more: *ultra-premium* and *ultra-economy* (Datta, 1996, 2012, 2017, 2018a, 2018b). The solution lies in serving the *middle* class by competing in the *mid-price* segment. This is the socio-economic segment that embodies about 40% of households in America (Datta, 2011). It is also the segment that Procter & Gamble (P&G), a leading global consumer products company, has successfully served in the past (Datta, 2010b, 2012, 2017, 2018a, 2018b).

### *1.1 The Strategic Importance of Price Positioning*

The second step is to position the brand at a price that is *somewhat* higher than that of the closest competition in the *mid-price* segment. This is in accord with P&G's practice based on the idea that although higher quality does deserve a "price premium", it should *not* be excessive (Datta, 2010b). A higher price offers two advantages: (1) it promotes an image of quality, and (2) it ensures that the strategy is both profitable and sustainable in the long run (*ibid*).

A classic example of price positioning is provided by General Motors (GM). In 1921 GM rationalized its product line by offering "a car for every purse and purpose"—from Chevrolet to Pontiac, to Oldsmobile, to Buick, to Cadillac. More importantly, GM positioned each car line at the *top* of its segment (Datta, 1996, 2010a, 2017, 2018a, 2018b).

A more recent and familiar example is the *economy* chain, Motel 6, which has positioned itself as "offering the *lowes*t price of any national chain". Another case is Fairfield Inn. When Marriott introduced this new chain, it targeted it at the *economy* segment. And then it positioned it at the *top* of

that segment (Datta, 1996, 2017, 2018a, 2018b).

*1.2 Close Link between Quality and Price*

As mentioned above, *customer* perceived quality is the most important variable contributing to the long-term success of a business. However, quality cannot really be separated from price (Datta, 1996). Quality, in general, is a complex multi-dimensional concept that is difficult to understand. So, consumers generally use *relative* price—and a brands' reputation--as a symbol of quality (Datta, 2010b, 2012, 2017, 2018a, 2018b).

## 2. A Brief History of Florida's Citrus Growers

Florida's oranges are called *Citrus sinesis*: the *sweet* orange that is supposed to be a cross between a pummelo and a mandarin. This *hybrid* is a native of northeast India and the adjoining areas of Myanmar and China. The two most important varieties of oranges in Florida are: Valencia and Hamlin (Hamilton, 2009, p. 4, pp. 9-10).

Named after a town in Spain, Valencia was introduced to Florida in 1876. Now it is known as the "Cadillac" of oranges, and every juice processor craves for it because of its "deep orange color, distinctive flavor, and high juice content" (*ibid*, p. 7).

Before the 1880s the common method of growing trees was from planting *seeds*. Because of the *hybrid* nature of *Citrus sinesis*, there was no assurance that planting the seed of one variety will produce an identical progeny. So, H. E. Hamlin made it a daily routine of walking around his orange grove to spot a seedling that stood out. And that is how he was able to discover the highly productive Hamlin in 1879: now the best-selling orange variety in Florida (*ibid*, pp. 7-8).

*2.1 The Budding System Transforms Orange Tree Planting in Florida*

After 1880s the *budding* system became the standard commercial practice of propagating orange trees that is still being used today. This procedure promised *earlier* fruit bearing, less thorny oranges, and—most importantly—*uniform* fruit. Each tree has its genesis in a nursery, where seed for the tree's rootstock is planted in a tray. In three to four months, when the seedling becomes six inches tall, it is transplanted into a *field*, or in the "container" method developed in the 1970s, a *pot*. After about two months when the seedling is ready, an incision is made in the seedling's stock where *budwood* (Note 2) from the desired sweet variety of orange is *grafted*. It takes about five to six years before a tree begins to produce commercially (*ibid*, p. 8).

*Budding* has transformed the way oranges are grown in Florida. Its focus on *uniformity* allows for much larger groves, because the groves do not require much interaction with individual trees: since each tree is expected to be identical (Hamilton, 2009, p. 9).

*2.2 Florida Citrus Growers Limit Production to Four Orange Varieties*

In the 2002-2003 season Hamlin topped Valencia in popularity in Florida, gaining 44% market share compared to Valencia's 35%. While, Valencia and Hamlin are ideal for producing juice, they are not as good as fresh fruit. Also, while being seedless was an asset for making juice, they were considered a

liability by growers who believed they could grow more trees from oranges that had seeds (Hamilton, 2009, pp. 10-11).

In 1922 a USDA pomologist (Note 3) observed that Florida had too much variety of sweet oranges. He said that was a handicap against California's just two: Navel and Valencia. A committee of orange growers accepted his advice, and recommended that the growers limit their orange crops to just *four* varieties of sweet oranges (*ibid*, p. 12).

Whereas California had just one orange variety suitable for juice processing—Valencia—all four varieties of Florida oranges were good for making juice. Thus, "Florida was primed to become the world's leading orange juice producer" (*ibid*, p. 13).

*2.3 The Birth of Florida Concentrated Orange Juice (FCOJ)*

During the first *half* of the twentieth century, Florida citrus growers had set their sights on the production and sale of *fresh* oranges, rather than processed juice. In 1935 a new government agency, the Florida Department of Citrus (FDOC), was created to represent the interests of Florida citrus growers. To meet the needs of World War II, the FDOC abandoned the practice of providing fresh fruit to consumers. Instead, it adopted the mission of figuring out how to provide orange *juice* with an *agreeable* taste for American troops around the world (Hamilton, 2009, p.16).

In the history of Florida, the year 1948 occupies a special status. It is this year that after almost ten years of research, a band of three scientists (Note 4) was *successful* in perfecting a process for making a prepared juice that was far *better* than the canned juice the consumers did not like at all earlier (*ibid*, p. 18).

The concentration process, which requires *heating* the juice to *evaporate* its water content, was well known before. But the new process, called the "cutback" process, was such it could retain the *flavor* of orange by adding some *fresh* juice to the concentrate, and then freezing it. The process also created a more nourishing product by *restoring* some of the *Vitamin C* that was lost in heating (Hamilton, 2009, pp. 18-20).

The discovery of this process led to the expansion of the Florida citrus industry, and the surrounding industries for transporting and warehousing the juice (Copage, 2000). Another major contribution of the "cut-back" method was that it was able to achieve *consistency* because each can of the frozen orange concentrate was an *exact* copy of the one that came before it. This is important for enterprises that sell food products on a large scale (Hamilton, 2009, p. 20; Datta, 2018b (Note 12).

The "cut-back" process was *patented* in 1948, and soon the patent was transferred from the government to a private business: Florida Foods. The company then entered into a contract with Vacuum Foods Corp. that transferred the patent to the latter. At the end of the decade, Vacuum Foods was renamed Minute Maid (Hamilton, 2009, pp. 20-21).

Although the FCOJ arrived too late for WW II, it came just in time to address a crisis in the industry when it "was just before dying", and Florida's citrus growers were just "starving". So, now Florida citrus growers were looking toward FCOJ as their savior. According to a USDA report, FCOJ was

going to return 49c to the growers for every dollar spent by the consumer: compared to just 30c for fresh fruit. That's why FCOJ was dubbed by some as "The Cinderella Product" (*ibid*, pp. 22-23).

In anticipation of FCOJ coming into the market, Florida orange growers decided to vastly increase their plantings during the 1940s and 1950s, and the Florida citrus industry continued on a spree of "glutting" the market driving *down* its price that was "slowly starving the hands that fed it" (*ibid*, p. 22).

The long gestation of *seven* years for orange trees to mature made it very difficult for growers to respond quickly to fast swings in juice demand. Frequent occurrence of *freezes* in Florida further complicated this problem (*ibid*, p. 23).

*2.4 The Citrus Greening Epidemic*

Citrus *greening*, also known as HLB, is a serious disease that is radically affecting citrus production all over the world. Thanks to HLB, orange production in Florida has been declining for years because of the Asian citrus psyllid, a tiny winged insect, that spreads this bacterial disease. Greening has destroyed groves, and has raised the cost of crop maintenance (Note 13).

Now more growers are developing methods to fight greening (Note 5). When trees resistant to HLB are planted, not only will the cost of producing oranges will go down, but both the fruit and juice yields will go up, too (Note 6).

According to one estimate, for the year beginning Oct.1, 2018 Florida may end up producing 70 million boxes of citrus fruit, a 56% jump over 45 million the year before: the smallest crop since 1945 (Note 5).

*2.5 Frequent Freezes: The Curse of Florida Agriculture*

A constant feature of Florida's agriculture is the repeated occurrence of freezes that have plagued the citrus industry ever since its inception. Between 1835 and 1989 Florida suffered from *thirteen* major freezes, of which *five* were impact freezes. An *impact* freeze is a freeze so severe that it destroys entire groves across the state, killing both mature and young citrus trees. This causes an intense economic impact on the citrus industry, and growers feel pressured to move farther *south*, where temperatures are *warmer* (Note 14).

The 1835 freeze is considered an *impact* freeze because it *ended* efforts to commercially grow citrus in South Georgia, southeast South Carolina, and in the *northern* part of Florida (Note 7).

The back-to-back freezes between December 29$^{th}$, 1894 and February 7, 1895 were also *impact* freezes that destroyed most of the citrus crop at that time. On December 29, 1894, Orlando reached an all-time low of 18F, and West Palm Beach recorded a low of 24F (Note 7).

The 1989 freeze was the fifth *impact* freeze in Florida since 1834 (Note 14) and some call it "the freeze of the century" (Note 8). This freeze resulted in almost total destruction of commercial citrus growing *north* of Interstate 4. As a result, there was a heavy migration of citrus groves from Lake county in *central* Florida—north of Interstate 4—to Hendry and Collier counties in *deep-south* Florida (Note 9).

Freezes are not the only natural calamity Florioda has to encounter recurrently; hurricanes are another menace Florida faces on a regular basis. For example, Hurricane Charley seriously damaged the citrus

industry in 2004 (Note 10). In 2018, because of Hurricane Irma Florida's citrus industry experienced its worst growing season since World War II (Note 11).

*2.6 Severe Freezes Force Florida to Import Orange Juice from Brazil*

Until the 1980s Florida was the global leader in orange juice production. However, due to back-to-back *freezes* Florida orange production stumbled from 207 million 90-pound boxes in 1979-1980, to 104 million boxes five years later: a drop of almost *50*% (Hamilton, 2009, p. 110).

So as not to lose its increasing customer base, the State of Florida approached Brazil, then the *second* largest orange juice producer, to make up the shortage. The state directed men and money into Brazil for building a strong orange juice processing center in that country (*ibid*, p. 110).

As of 2004, Brazil's larger groves were producing oranges at one dollar per box, while in Florida the cost was fifty percent *higher*. This is because in Brazil there are are fewer environmental regulations, and both land and labor are cheaper. So, the U.S. has imposed a tariff on import of orange juice from Brazil to protect Florida growers (Hamilton, 2009, p. 111; Walker, 2009).

According to one estimate, Brazilian companies, like Cutrale and Citrusuco, owned about 40% of Florida's orange juice processing capacity in 2004 (Hamilton, 2009, p. 122).

*2.7 Vanishing Orange Groves means Florida Citrus is Losing Its Identity*

The impact of Brazil over Florida goes beyond the processing of orange juice. Brazil's vast supply of land to grow oranges is *depressing* the value of Florida's citrus groves. Florida was once synonymous with oranges, but *not* anymore. In the words of Hamilton (2009, pp. 3-4, *italics* added):

- Orange trees in Florida are relatively few and far between. They no longer line the highways as they used to, sprouting juice stands along the way. Whole groves are being uprooted to make room for the state's tourists and retirees.
- [The] actual number of juice oranges the state grows is *declining*. Oranges from *Brazil*, *not* Florida, supply North America and the world with *most* of its juice.

## 3. A Brief History of Florida Orange Juice Processors

In Florida, there are three major orange juice producers: Tropicana, the market leader, owned by PepsiCo; Minute Maid, and Simply Orange, owned by Coca-Cola Co.; and Florida's Natural, an arm of Florida's Natural Growers cooperative.

*3.1 Tropicana*

Anthony Rossi, an immigrant from Sicily, founded Tropicana in 1947 (Note 15). Beatrice Co. bought Tropicana in 1978. In 1988 Seagram Co. beame the next owner of Tropicana, and ten years later Seagram sold it to PepsiCo (Note 16).

In 1954 Tropicana pioneedred a *flash* pasteurization method that raised the temperature of freshly-squeezed orange juice *briefly* that extended its shelf-life to *three* months, and yet maintained its flavor. As a result, the company introduced ready-to-serve (RTS) *chilled* orange juice in the market (Note 17).

Tropicana was the run-away market leader of the U.S. Refrigerated Orange Juice market with a share of 39% in 2008 (Table 1).

*3.2 Minute Maid*

As mentioned ealier, the *patent* for Florida citrus *concentrate* was eventually transferred to Vacuum Foods, which, a decade later, was renamed Minute Maid.

Minute Maid recruited the famous crooner Bing Crosby to sing commercials for its FCOJ. Edwin Moore, the lead-inventor of FCOJ, believes that Crosby deserves a lot of credit "in FCOJ's almost instant transformation into a beverage *favorite*" (Hamilton, 2009, p. 26; *italics* added).

In 1960 Minute Maid became a part of Coca-Cola Co (Coke) (Note 18).

To take advantage of the rising segment of ready-to-serve (RTS) chilled orange juice, Minute Maid decided to enter it in 1973 (Note 18).

In the 1990s Coke began selling Minute Maid's processing plants to a Brazilian Co., Cutrale. This is because Coke came to realize that the juice-processing operations of Minute Maid yielded an ROI of just 8%, compared to 25% on the marketing end of the business (Hamilton, 2009, p. 112). Minute Maid was the *runner-up* in the Refrigerated Orange Juice market with a share of 15% in 2008 (Table 1).

*3.3 Simply Orange*

The Coca-Cola Co. launched Simply Orange *pasteurized* orange juice in 2001. In 2003 the company opened a multi-million dollar packaging plant in Florida to compete against Tropicana's pasteurized (or "Not From Concentrate") orange juice (Hamilton, 2009, p. 136).

In a short seven years Simply Orange was able to reach a market share not far from that of Minute Maid (Table 1).

*3.4 Florida's Natural*

Florida's Natural brand is owned by a cooperative, Florida's Natural Growers, that was founded in 1933 (Note 19). Like Tropicana, Florida's Natural also sells *pasteurized* orange juice. It had a market share of 10.8% in 2008.

## 4. How Pasteurized or "Not From Concentrate" Orange Juice Is Processed

The pasteurized RTS is the most popular variety of orange juice in Florida. As mentioned earlier, Tropicana was the inventor of the flash pasteurization process. To be able to supply pasteurized orange juice year round requires large-scale storage capacity. So, Tropicana initially came up with a *simple* solution to address this problem. It stored *frozen* slabs of freshly-squeezed juice in above-ground *tunnels* (Hamilton, 2009, p. 140; Walker, 2009).

But, to keep up with the rising demand of RTS—and Tropicana's success as the leading RTS provider—the company began exloring *cheaper* modes of storing RTS. So, in the nineties Tropicana *replaced* most of these tunnels with a *cheaper*—but much more *complex*—technology of *aseptic* storage *tanks*. This technology calls for *stripping* the juice of oxygen, a process known as "*dearation*", so that he juice does *not* oxidize in the million-gallon tanks in which it can be stored for over a year

(*ibid*).

However, when the juice is stripped of oxygen it is also stipped of *flavor*-providing chemicals. So, the juice processors engage the services of fragrance companies, such as, Calvin Klein and Dior, to engineer *flavor* packs to *add back* to the juice to make it taste fresh (Hamilton, 2009, Ch. 12, 13).

Formulations of flavor packs are determined by the juice processors. For example, the flavor packs for the North American market contain ethyl butyrate. This is the chemical that is in the fragrance of *fresh*-squeezed oranges: a flavor Americans like. On the other hand, Brazilians and Mexicans have a different taste. Likewise, Minute Maid has a *candy*-like flavor (Hamilton, 2009, Ch. 12-13).

*4.1 "Tunnel" Storage vs. Storage in Aseptic Tank Farms*

With *asceptic* tanks, the juice is heated *before* it gets into the tank, and then again *before* it goes into the package for sale. But, when juice is stored in above-ground tunnels in *frozen* blocks, it is heated *only* when it is ready to go into a package. But, more the juice is heated, the more its freshly-squeezed taste is *depleted* (Hamilton, 2009, p. 141).

*4.2 RTS Orange Juice from Reconstituted Frozen Concentrate ("Recon")*

In 1950 per capita consumption of *processed* orange juice—concentrate, canned, and pasteurized—was 8 pounds, but by 1960, this figure had *more* than doubled to 20 pounds, or 2.3 gallons: with orange juice from *concentrate* growing the most at 16 pounds (Hamiltin, 2009, pp. 25-26).

After the introduction of *pasteurized* orange juice by Tropicana in 1954, the sales of *chilled* orange juice—later labeled *ready-to-serve* juice (RTS) —began to rise. To meet this growing demand, makers of concentrated orange juice discovered a new process—called "Recon"—of producing RTS by *reconstituting frozen* concentrate". And soon the sales of "Recon" started to rise, too (Hamilton, 2009, p. 24, p. 130).

"Recon" has one main advantage over pasteurized juice, and that is that it is *cheaper* to produce. This is because it is made from *space*-saving *frozen* concentrate which stores *compactly*, and unlike pasteurized juice stored in aseptic tanks, does not require epsensive storage infrastructure. Generally, "Recon" processors add water only at the point of distribution, or at retail. As a result, while storage of concentrate costs about *one* penny per pound per year, storing pasteurized juice costs about 20-25 times as much (Hamilton, p. 130).

High storage cost of pasteurized juice was not the only factor Tropicana was having a hard time competing with the likes of Minute Maid. Another was the heightened competition from "Recon". More importantly, still another reason was that the *freezes* that hit Florida in 1981, 1983, 1985, 1987, and 1989 had caused devastation in its citrus industry. So, "Recon" processors began to import *Brazilian* concentrate to meet consumer demand. However, Tropicana was unable to do so because technology did not exist then to move large tanks of liquid orange juice.

*4.3 NFC and the Power of Product Positioning/Promotion*

So, Tropicana hired a market research firm to address the dilemma it was facing. The research firm recommended that in future Tropicana should make and market only "Recon". However, Allan Morris,

then in-charge of orange and juice procurement, had a different opinion. First, he argued that switcing to "Recon" will *improve* quality—because the juice will taste *better*. He said that while you can hide your mistakes in an evaporator (when making "Recon") you cannot do so in making pasteurized juice. Then turning around, he presented the following *counter*-argument (Hamilton, 2009, pp. 131-132; *italics* added):

- [T]he consumer wants something, the closest they can find to *fresh*-squeezed, and you can *market*…the concept of an orange juice that [*hasn't*] been manufactured as much and it will have some merit.

Agreeing with Morris, Spencer Vogue, Tropicana's President, made a bold move. He decided that "we're going to tell the consumer that our product is *not* made from concentrate". Persuaded that consumers judge "juice by the *cover*", he decided to "tinker with *words* rather than with substance." So, Tropicana began *promoting* its *Pure Premium* brand as "*Not From Concentrate*" (NFC) to *differentiate* its pasteurization *process* as being *superior* to the concentrate roots of "Recon". In addition, it also started charging more for it both to cover its higher storage costs, but alo to promote an *image* of quality, as we have suggested (Hamilton, 2009, pp. 130-132; *italics* added).

Thanks to Vogue's decision, Tropicana's sales exceeded all expectations. In the next *five* years—thanks to NFC's powerful promotion—Tropicana *doubled* its sales volume and almost *tripled* its profits. The industry-wide sales of NFC, too, jumped from $653 million in 1990 to $1.03 billion in 1995 (*ibid*, p. 133).

Taste tests confirmed why the NFC campaign was so successful. The essence of tasters' conclusion was that even if NFC "didn't taste as good but I know it's better for me and better for my family". The primary reason for its popularity was that "it was *perceived* as being *fresh* squeezed: and that was better than having to go through some terrible process of *concentrating* and then adding back water". Surprisingly, the consumers expressed their preference for Tropicana, even as Tropicana executives felt that NFC tasted *no* better than "Recon" (*ibid*, pp. 133-134; *italics* added).

*4.4 It Is Customer-perceived Quality That Counts*

As we have mentioned earlier, it is customer-*perceived* quality that is critical to long-term competitive position and profitability of a business. Regardless of what objective measures of quality may be, it is how customers *perceive* quality that affects their brand preference. Furthermore, as we have indicated above in section 5.0 that covers flavor packs, determining how orange juice tastes is highly *subjective*, and therefore, there can be no single standard for it.

*4.5 Coca-Cola's Simply Orange Enters the NFC Segment*

Toward the end of the 20th century NFC was the only type of orange juice that was still growing, a category dominated by Tropicana and Florida's Natural. This was a clear indication that NFC had become a consumer favorite. So, now every brand and processor wanted a piece of this pie (Hamilton, 2009, p. 114).

To take advantage of this wave, the Coca-Cola Co. introduced a new brand, Simply Orange, that

offered an NFC version of orange juice in 2001 (Note 20). Thanks to Coke's marketing muscle, Simply Orange was able to garner a market share of 14.1% in 2008, just behind Minute Maid (Table 1).

## 5. The U.S. Refrigerated Orange Juice Market—Price-Quality Segmentation Profile (Note 21)

This study is based on U.S. retail sales for 2008 and 2007 (Note 22). The data includes total dollar and unit sales, no-promotion dollar and unit sales, and promotion dollar and unit sales (Note 23).

U.S. Refrigerated Orange Juice retail sales for 2008 were $2.6 Billion. It is a very competitive market with 142 brands in 2008. There were 14 pack-sizes ranging all the way from 6 oz to 128 oz. Of these, the 64-59 oz size captured two-thirds of the market at 66%. So, we have concentrated our analysis on 32 brands each of whose 64 or 59 oz pack sales for 2008 were over $1 Million.

### *5.1 Hierarchical Clustering as the Primary Instrument of Statistical Analysis*

We have used *cluster analysis* as the primary statistical tool in this study. As suggested by Ketchen and Shook (1996), we have taken several steps to make this effort as objective as possible.

- First, this study is *not* ad-hoc, but is founded in a theoretical framework, as laid out below.
- Second, we are fortunate that we were able to get sales data for our study for *two* years. Thus, this data provided a robust vehicle for subjecting cluster consistency and reliability to an *additional* test.
- Third, we wanted to use two different techniques—KMeans and Hierarchical—to add another layer of cluster consistency and reliability. However, we found Hierarchical cluster analysis to be superior in meeting that test. So, we did *not* consider it necessary to use the KMeans technique.

### *5.2 Theoretical Foundation for Determining Number of Clusters—And Their Meaning*

As already stated, a major purpose of this paper is to identify the market share leader and determine the price-quality segment—based on unit *price*—it is competing in.

An important question in performing cluster analysis is determining the *number* of clusters based on an *a priori* theory. Most consumer markets can be divided in three *basic* price-quality segments: *premium, mid-price*, and *economy.* These three basic segments can be extended to *five*: with the addition of *super-premium* and *ultra-economy* segments (Datta, 1996).

Therefore, *three* represents the *minimum* and *five* the *maximum* number of clusters (Datta, 2012, 2017, 2018a, 2018b).

An equally crucial issue is to figure out what each cluster (e.g., *economy*, *mid-price*, *and premium*) really *means*.

Perhaps a good way to understand what each price-quality segment stands for in real life is to look at a socio-economic *lifestyle* profile of America. It reveals *six* classes. Each class is associated with a price-quality segment typified by the retail stores where they generally shop: each a symbol of their lifestyle (Datta, 2011) (Note 24).

### *5.3 Guidelines for Cluster Consistency and Reliability*

In addition to laying a theoretical foundation for the number of clusters, we set up the following guidelines to enhance cluster consistency and reliability (Datta, 2012, 2017, 2018a, 2018b):

- In general, there should be a *clean break* between *contiguous* clusters.
- The *anchor* clusters—the top and the bottom—should be *robust*. In a cluster-analysis project limited to a range of three to five clusters, a robust cluster is one whose membership remains constant from three- to four-, or four- to five-cluster solutions.
- Finally, we followed a step-by-step procedure to determine the optimal solution. First, we start with *three* clusters. Thus, the bottom cluster obviously becomes the *economy* segment and the top cluster the *premium* segment. Next, we go to four clusters, and *tentatively* call them: *economy*, *mid-price*, *premium*, and *super-premium*. Then we go to five clusters. If the membership of the bottom cluster remains unchanged from what it was in the four-cluster result, it clearly implies that the *ultra-economy* segment does *not* exist. Next, if the membership of the top cluster also remains the same from a four- to a five-cluster solution, then the *top* cluster becomes the *super-premium* segment. This means that even in a five-cluster solution we have only *four* price-quality segments: *economy*, *mid-price*, *premium*, and *super-premium*. It implies that either the *premium* or the *mid-price* segment consists of two *sub*-segments (Table 1).

In addition, whenever possible, we have tried to seek *external* evidence to validate the results of cluster analysis. For example, many companies identify on their websites a certain brand(s) as a *premium* or luxury brand. Another case is that of P&G which clearly says it does *not* compete in the *economy* segment (Datta, 2010b).

*5.4 Testing Hypotheses*

- I—That the market-share leader would be a member of the *mid-price* segment.
- II—That the market-share leader would carry a price tag that is *higher* than that of the nearest competition.

*5.5 Results of Cluster Analysis*

In Table 1 we present the results of 2008 Hierarchical cluster analysis for the 64- and 59-oz packs which had 66% market share in 2008. This analysis is restricted to 32 brands each of whose sales of the 64- or 59-oz packs were over $1 Million (Note 25).

Tropicana, owned by Pepsi Co., was the runaway market leader with an overall market share of 38.9%. It is a member of the *mid-price* segment, a result that strongly supports Hypothesis I.

Minute Maid, owned by the Coca Cola Co., is the runner up with a total market share of 14.6%, and a unit price of $2.86 that is lower than Tropicana's $3.19. So, this result, too, supports Hypothesis II.

*5.6 What Are Private Brands?*

It is important to clarify what *private* brands are. These are brands made exclusively for individual retailers, e.g., a supermarket, or a drug store. Usually, such brands are targeted to the *economy* segment, and, as such, are generally sold at prices *lower* than those of major name brands. One reason, retailers like private brands is because private brands tend to be more profitable than name brands (Datta, 2018b).

*5.7 Relative Price a Strategic Variable*

Finally, we performed one more test to determine the consistency and reliability of the results of cluster analysis in this study. So, we *ranked* the unit price of each brand—both for 2008 and 2007.

For both years, and all three measures of bivariate correlation—Pearson, and non-parametric measures Kendall's tau__b, and Spearman's rho—were found to be significant at an amazing 0.01 level!

We believe these surprising results—that cover such a large number of brands—became possible only because management in the U.S. Refrigerated Orange Juice market must have been treating *relative* price as a strategic variable, as we have suggested.

While the price of a brand, compared to its nearest competition, may change over time, it is *unlikely* to change much from one year to the next. This is significant not only for the market share leader, but also for every brand no matter which price-quality segment it is competing in.

Another conclusion one can draw from such incredible results is that the U.S. Refrigerated Orange Juice market is highly competitive.

*5.8 A Pattern Emerging for Consumer Markets*

Now let us compare the results of this project to similar studies of four consumer markets: (1) The U.S. Men's Shaving Cream (Datta, 2012), (2) The U.S. Beer (Datta, 2017), (3) The U.S. Shampoo (Datta, 2018a), and (4) The U.S. Shredded/Grated Cheese (Datta, 2018b). The results reported here very closely match those revealed by the above research.

Similarly, all four studies, like this one, concluded that *relative* price was a *strategic* variable.

It is clear from the foregoing that the results of this study do not just stand by themselves, but, rather, are part of an emerging pattern in consumer markets.

**Table 1. Hierarchical Cluster Analysis: The U.S. Refrigerated Orange Juice Market, 2008 (32 Cases)**

| Price-Quality Segment | Brand Name | Size Oz | Upr 2008 | Cluster Center | MktShr % | TotalBrand Sales2008$M |
|---|---|---|---|---|---|---|
| ***Super-premium*** | NO COMPANY LISTED | 64 | $9.30 | $8.77 | 0.1% | 2.3 |
| | NAKED | 64 | $8.52 | | 0.1% | 3.6 |
| | JUICE HARVEST | 64 | $8.49 | | 0.1% | 1.8 |
| ***Premium I*** | ODWALLA | 64 | $6.91 | $6.27 | 0.5% | 13.7 |
| | JUST SQUEEZED | 64 | $6.62 | | 0.2% | 5.9 |
| | ORGANIC VALLEY | 64 | $6.07 | | 0.2% | 4.2 |
| | UNCLE MATT'S | 59 | $5.47 | | 0.1% | 1.8 |
| ***Premium II*** | NATALIE'S ORCHID ISLAND | 64 | $5.16 | $4.55 | 0.3% | 6.7 |
| | SUN HARVEST | 64 | $4.59 | | 0.1% | 2.4 |
| | PRIVATE BRANDS 59OZ | 59 | $3.90 | | 0.0% | |
| ***Mid-Price*** | INDIAN RIVER SELECT | 59 | $3.46 | $3.21 | 0.3% | 7.8 |
| | SIMPLY ORANGE | 59 | $3.43 | | 14.1% | 364.4 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | TROPICANA 59OZ (Note 26) | 59 | $3.20 | | 0.0% | |
| | MINUTE MAID 59OZ (Note 26) | 59 | $3.19 | | 0.0% | |
| | **TROPICANA 64OZ** | **64** | **$3.19** | | **38.9%** | **1,004.6** |
| | FLORIDA'S NATURAL (Note 26) | 64 | $3.10 | | 10.8% | 278.9 |
| | **MINUTE MAID 64OZ** | **64** | **$2.86** | | **14.6%** | **377.6** |
| ***Economy*** | FLORIDA'S CHOICE | 64 | $2.55 | $2.20 | 0.1% | 2.1 |
| | DONALD DUCK | 64 | $2.44 | | 0.6% | 15.5 |
| | DOLE | 64 | $2.44 | | 0.5% | 12.9 |
| | COUNTRY FRESH | 64 | $2.40 | | 0.1% | 3.6 |
| | PRIVATE BRANDS 64OZ | 64 | $2.39 | | 15.0% | 387.4 |
| | KEMPS | 64 | $2.38 | | 0.1% | 2.7 |
| | HOME MAKER | 64 | $2.25 | | 0.1% | 2.9 |
| | WELLS BLUE BUNNY | 64 | $2.22 | | 0.1% | 2.6 |
| | ANDERSON ERICKSON | 64 | $2.17 | | 0.1% | 3.0 |
| | DEAN | 64 | $2.13 | | 0.2% | 5.7 |
| | PRAIRIE FARMS | 64 | $2.03 | | 0.2% | 4.8 |
| | LAND O LAKES | 64 | $2.00 | | 0.2% | 4.4 |
| | TREE RIPE | 59 | $1.95 | | 0.6% | 15.1 |
| | HILAND | 64 | $1.84 | | 0.3% | 6.7 |
| | ROBERTS | 64 | $1.80 | | 0.2% | 4.5 |
| | **Total 64 and 59 Ounces (32 cases)** | | **$3.01** | | **98.7%** | **$2,550** |
| | **Total Sales (all sizes)** | | | | **100%** | **2,582** |

*5.9 The Role of Promotion*

For 2008, promotional sales averaged 46% of total net sales for 39 brands with sales over $1 Million that represented 99% of total net Refrigerated Orange Juice sales. This score matches very closely with the mark of 48% for Lager Beer, and 45% for Shredded/Grated Cheese: all three part of the larger food industry (Datta, 2018b).

We performed bivariate correlation between total (net) sales vs. promotional (PROMO) sales. The results were significant for *all* three measures—Pearson, Kendall's tau_b, and Spearman's rho—at the 0.01 level.

In Table 2, we present 2008 *promotiona*l sales data for 14 brands with sales over $5 Million. The highlights of the results are as follows:

- First let us look at the "Big Three": Tropicana—owned by the Pepsi Co.—Minute Maid, and Simply Orange—owned by the Coca Cola Co. All three are *mid-price* brands, and all fall in the *Heavy* group.
- Next comes Florida's Natural (FN). It is also a *mid-price* brand which is owned by Florida's Natural Growers, a Florida agricultural cooperative. Unlike the "Big Three," FN is a member of the *Very Heavy* group. It seems that facing three formidable competitors, FN has chosen to use a *higher* level of promotion than the "Big Three" to hold its own.

- Finally, there are the Private Brands, which as a *group*, had a 2008 market share of 15% (Table 1). They are part of the *economy* segment, as is usually the case. Normally, a lower price should not need heavy promotion. However, private brands tend to be more profitable than name brands. So, it appears the retailers were able to employ a *lower* price as well as *heavy* promotion at the same time (Datta, 2018a).

**Table 2. Percentage of Promo Sales to Total (Net) Sales: Refrigerated Orange Juice, 2008**

| | **PromoLevel** | **Sales$ Millions** | **%PROMO** |
|---|---|---|---|
| **Grand Total** | | **2,582** | **45.8%** |
| **Brands with 2008 Sales >$5M (14 )** | | | |
| TREE RIPE | **Very Heavy** | 15 | 85.6% |
| FLORIDA'S NATURAL | | 279 | 60.8% |
| MINUTE MAID | **Heavy** | 378 | 46.9% |
| TROPICANA | | 1,005 | 46.1% |
| DONALD DUCK | | 15 | 45.5% |
| DOLE | | 13 | 45.3% |
| SIMPLY ORANGE | | 364 | 42.5% |
| HILAND | | 7 | 42.3% |
| ODWALLA | | 14 | 41.2% |
| PRIVATE BRANDS | | 387 | 40.1% |
| INDIAN RIVER SELECT | **Moderate** | 8 | 36.3% |
| DEAN | | 6 | 31.6% |
| NATALIE'S ORCHID ISLAND JC CMP | **Light** | 7 | 14.2% |
| JUST SQUEEZED | | 6 | 0.2% |

**6. Strategic Groups in the Refrigerated Orange Juice Market, 2008**

We found *five* strategic groups in this market:

- 1. The PepsiCo—*Market Leader*
  - Tropicana—38.9%
- 2. The Coca Cola Co.—*Runner-up*
  - Minute Maid—14.6%
  - Simply Orange—14.1%
- 3. Florida's Natural Growers (cooperative)
  - Florida's Natural—10.8%
- 4. Private Brands—15%
- 5. Small Family-owned Enterprises—5.3%

*6.1 The PepsiCo, Inc.*

PepsiCo was established through the merger of Pepsi Cola Co. and Frito Lay Co. in 1965. Its sales for 2017 were $63 Billion (Note 27). PepsiCo acquired Tropicana in 1998 from Seagram Co. In 2008

Tropicana was a clear market leader with a share of 39%: far and above Runner-up Minute Maid's 15%, and 10% more than the shares of Minute Maid and Simply Orange combined.

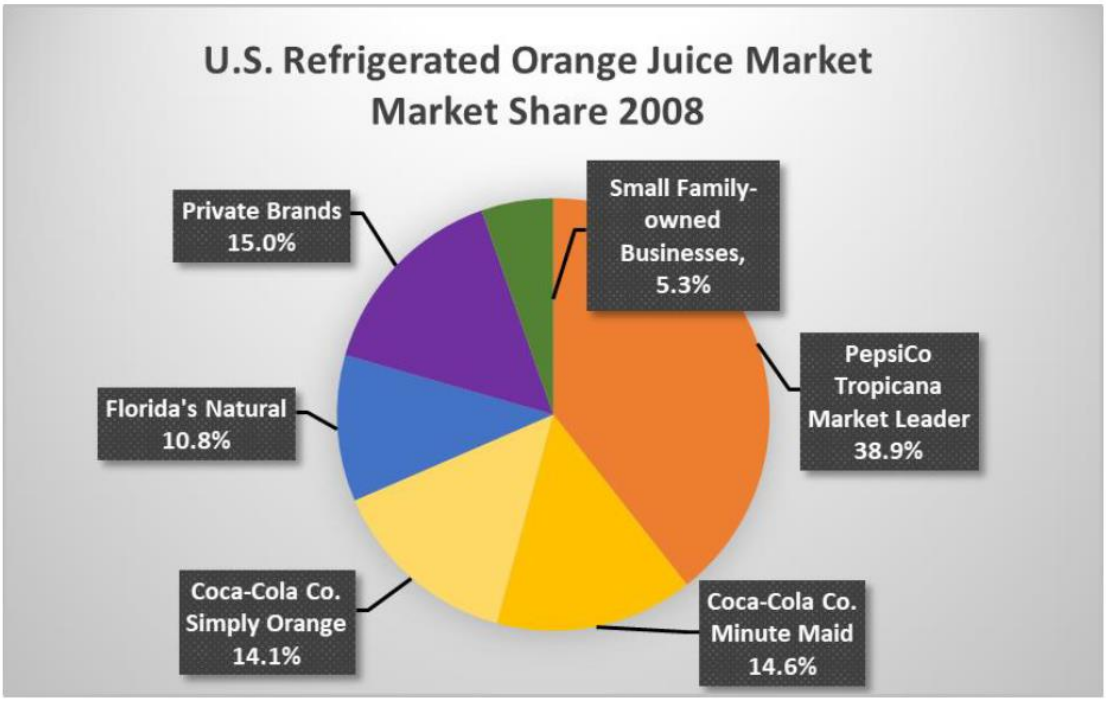


**Figure 1. Strategic Groups: U.S. Refrigerated Orange Juice Market**

*6.2 Coca-Cola Co*.

The company was founded in 1886 in Atlanta, GA. Its annual sales for 2017 were $35 Billion (Note 28). Minute Maid, bought by Coca-Cola Co. in 1960, was the runner-up, with a market share of 14.6%. Right behind Minute Maid is Simply Orange which was introduced in 2001. Riding the NFC wave, Simply Orange was able, in seven short years, to catapult itself to a market share of 14.1% by 2008 (Table 1).

*6.3 Florida's Natural Growers*

This Florida cooperative is owned by Florida's orange growers, and came into being in 1933. In 2008 the coop's brand, Florida's Natural (FN), had a market share of 10.8% (Table 1). It is worth noting that, unlike PepsiCo, or Coca Cola, FN is not importing oranges or orange juice from Brazil. Thus, it is the only major orange juice producer that is still making and selling orange juice from oranges grown in Florida (Note 19).

*6.4 The Private Brands Group*

The Private Brands Group posted a respectable showing with a market share of 15% in 2008 (Table 1). Now let us compare this with the group's record in the Shredded/Grated Cheese market where the group did phenomenally well with a massive 2008 market share of 49%. With the exception of Kraft and Sargento, with market shares of 28% and 9%, respectively, the rest of the competition consisted of

small brands (Datta, 2018b). On the contrary, the group was facing formidable competition in the Orange Juice market facing several major brands: Tropicana, Minute Maid, Simply Orange, and Florida's Natural, all of which collectively had captured a huge market share of 78%. Clearly, while the competitive environment in the Orange Juice market was quite dauning for private brands, the Shredded/Grated Cheese market provided an ideal arena for them because of the proliferation of small brands in that market.

*6.5 Small Family-owned Enterprises*

Finally, there were 27 small family-owned businesses with an overall market share of 5.3%.

*6.6 Orange Juice Market on a Decling Trend*

The demand for U.S. orange juice has been on a downward trajectory for a long time. The market declined by *50%* over a sixteen-year period between 2001-02 to 2016-17. In their magazine the Florida Citrus Industry (FCI) points out that one reason for this decline in demand is higher prices because of lower production, and this, in turn, has caused consumers to switch to other juices and beverages (Note 6).

Second, FCI says some nutritionists and physicians have been faulting orange juice for its high sugar content, which they claim leads to obesity. But, FCI argues that although per-capita consumtion of non-diet soda is *ten* times as high as orange juice, health care experts are "not attacking soft drinks as much as orange juice" Note 6).

Third, while orange juice does contain natural sugars, it is like any other 100% fruit juice (Note 6).

Fourth, orange juice is remarkably high in vitamin C, and contains potassium citrate, vitamins and other compounds that may act as *anti-oxidants* in the body (Note 6).

Fifth, the nutritional attributes of orange juice may help to support body's *immune* system and protect cells against free radicals (Note 6).

Finally, if sugar were the cause of obesity, almost half of American population would have lost weight when they swithched to diet sodas. But that did not happen (Note 6).

## 7. Conclusion

This study is based on the idea that in most consumer markets, a business seeking market-share leadership should try to serve the *middle* class by competing in the *mid-price* segment; and offering quality better than that of the competition: at a somewhat *higher* price to connote an image of quality, and to ensure that the strategy is both profitable and sustainable in the long run. The middle class is the socio-economic segment that represents about 40% of households in America.

Quality, however, is a complex concept that consumers generally find difficult to comprehend. So, they often use *relative* price and a brand's reputation as a symbol of quality.

The Refrigerated Orange Juice market is very competitive; it generated $2.6 Billion sales in 2008. We have focused our analysis on 64- and 59-oz packs which, together, accounted for about two-thirds of the market at 66% in 2008. This segment includes 32 brands each of whose 64-59 oz sales were over

$1 Million.

The main objective of this study is to test two hypotheses: (1) That the market leader would be a member of the *mid-price* segment; *and* (2) That the market leader would carry a price tag *higher* than that of the nearest competition.

Employing Hierarchical cluster analysis, we found that Tropicana, the market leader, and Minute Maid, the runner-up, were members of the *mid-price* segment for both 2008 and 2007. Second, Minute Maid had a unit price that was *lower* than that of Tropicana for both years. Thus, these results supported both Hypothesis I and II.

To determine the consistency and reliability of the results of cluster analysis, we found bivariate correlation of unit price *rank* data of each brand for 2008 and 2007 to be significant at a remarkable 0.01 level.

An important conclusion one can draw from such an amazing result is that the management in the U.S. Refrigerated Orange Juice market must have been treating *relative* price as a *strategic* variable, as we have suggested.

We compared the results of this project with four similar studies: the U.S. Men's Shaving Cream market, the U.S. Beer market, the U.S. Shampoo market, and the U.S. Shredded/Grated Cheese market. We found the results to be very similar, indicating a pattern emerging for consumer markets.

Similarly, all four above-mentioned studies concluded that *relative* price was a *strategic* variable.

*Promotion* played an important role in the industry, because bivariate correlation between net sales and promotional sales was significant at 0.01% level, for both 2008 and 2007. The other four consumer markets mentioned above also reported similar results.

We found *five* strategic groups in the market: (1) The PepsiCo, (2) The Coca-Cola Co., (3) Florida's Natural Growers [cooperative], (4) The Private Brands Group, and (5) Small Family-owned Enterprises.

Before the 1880s the common method of growing trees was from planting *seeds*. After 1880s the *budding* system became the standard practice of breeding orange trees, because it made it possible that each variety of orange seedling planted will yield *identical* fruit. *Budding* system's focus on *uniformity* has transformed the industry as it allows for much *larger* groves; this is because the growers do not need to have much interaction with individual trees since all are going to be alike.

In the twenties a committee of orange growers, Florida Citrus Exchange, recommended that the growers limit their orange crops to just *four* varieties of sweet oranges. Whereas California had just one orange variety suitable for juice processing—Valencia—*all* four varieties of Florida oranges were good for making juice. And that included Valencia, known as the "Cadillac" of oranges. Thus, Florida was set to become the world's leading orange juice producer.

The year 1948 occupies a special place in the history of Florida citrus, This is the year when a band of three scientists finally *successed* in producing *frozen* orange juice *concentrate*. The patent for this

process was soon transferred to a private company that later renamed itself Minute Maid which was acquired by the Coca-Cola Co. in 1960.

In 1954 Tropicana invented a *flash* pasteurization method that raised the shelf-life of orange juice to *three* months. Consequently, the company introduced ready-to-serve (RTS) *chilled* orange juice. In 1998 Tropicana was acquired by the PepsiCo from Seagrram Co.

Due to back-to-back freezes in the 1980s, Florida's citrus production declined by about 50%. So, the Government of Florida enlisted the help of Brazil to make up this shortfall. In 2004 Brazilian companies, like Cutrale and Citrusuco, owned about 40% of Florida's orange juice processing capacity.

After the introduction of *pasteurized* orange juice by Tropicana in 1954, the sales of RTS began to go up. To meet this growing demand, makers of *concentrated* orange juice soon discovered a process—called "Recon"—of producing RTS orange juice from *frozen* concentrate. As a result, the sales of "Recon" started to rise, too. And in time it became a major threat to Tropicana.

"Recon's" major advantage over pasteurized RTS juice is that it is *cheaper* to produce. This is because it is made from *space*-saving *frozen* concentrate which stores *compactly*, whereas storing the pasteurized juice requires a large-scale *infrastructure.* While the storage of concentrate costs about *one* penny per pound per year, the latter costs about 20-25 times as much.

To address the increasing popularity of "Recon", Tropicana's Board of directors made two surprising decisions: (1) In the future the company is going to *promote* Tropicana's *Pure Premium* brand as *"Not From Concentrate"* (NFC) to *differentiate* its pasteurization *process* as being *superior* to the concentrate roots of "Recon", and (2) It *raised* the price of Tropicana's *Pure Premium* brand over "Recon" brands, both to reflect NFC's higher storage cost, as well as to project an image of *quality*, as we have suggested in this paper.

Taste tests confirmed why the NFC campaign was so successful. The primary reason for its preference was that consumers *perceived* it as being *fresh* squeezed, even though Tropicana executives felt that NFC tasted *no* better than "Recon".

Thanks to this bold decision, Tropicana's sales exceeded all expectations. In the next *five* years—thanks to NFC's powerful promotion—Tropicana *doubled* its sales volume and almost *tripled* its profits; and by 2008, Tropicana had become the *market leader* with a commanding market share of 39%.

To take advantage of the NFC wave, the Coca-Cola Co. introduced a new brand, Simply Orange, that offered an NFC version of orange juice in 2001. Thanks to Coke's marketing prowess, Simply Orange was able to gain a market share of 14.1% in 2008, just behind Minute Maid.

Brazil's vast supply of land to grow oranges is *depressing* the value of Florida's citrus groves. Florida was once synonymous with oranges, but *not* anymore. Orange trees in Florida are now relatively few and far between. They no longer line the highways as they used to, and whole groves are being uprooted to make room for the state's tourists and retirees. The number of juice oranges the state grows is *declining*. Today oranges from *Brazil*, *not* Florida, supply North America and the world with *most* of its juice.

Citrus *greening*, also known as HLB, is a serious disease because of which orange production in Florida has been declining for years. However, now more growers are developing methods to fight the disease. And when trees resistant to HLB are planted, not only will the cost of producing oranges go down, and both fruit and juice yield will go up, too.

The demand for U.S. orange juice has been going down for a long time. One reason is that lower orange production has caused prices of orange juice to go up, which has caused consumers to switch to alternative juices and beverages. Second, according to Florida Citrus Industry (FCI) t health care experts have wrogly been blaming orange juice for its high sugar content, which they claim leads to obesity. They argue that these experts do not recognize various health attributes of orange juice, especially vitamin C.

We found *five* strategic groups in the market: (1) The PepsiCo, (2) The Coca-Cola Co., (3) Florida's Natural Growers [cooperative], (4) The Private Brands Group, and (5) Small Family-owned Enterprises.

In this study we have relied deeply on Alyssa Hamilton for her incisive book on orange juice. An underlying theme of Hamilton is that the large orange juice processors have been successful in creating an aura of "golden goodness" around the product. She says we as a society don't pay much attention to processed food like orange juice that is advertised as "pure, fresh, and additive free". One factor that is partially to blame for this situation is widespread consumer ignorance about how orange juice is processed and advertised.

Finally, she suggests that regardless of what and how much information major orange juice sellers may be willing to reveal to the public, their communications should at least be truthful.

**Acknowledgements**

We are immensely grateful to A.C. Nielson Co. for their extraordinary generosity for the invaluable U.S. national retail sales data of the U.S Refrigerated Orange Juice Market for 2008 and 2007, without which this project would not have been possible.

We are also immeasurably in debt to Alyssa Hamilton for her masterful book, *Squeezed: What you don't know about Orange Juice*, upon which we have relied heavily for a brief history of Florida's Orange Juice industry.

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**Notes**

Note 1. Profit Impact of Market Strategies.

Note 2. It is now commonly procured from Florida's Dept. of Plant Industry.

Note 3. A pomologist is a scientist who is responsible for ensuring the healthy growth and breeding of fruits and nuts, and the trees and bushes on which they grow.

Note 4. The team included Edwin Moore, Louis MacDowell and Cedric Atkins.

Note 5. https://www.bloomberg.com/news/articles/2018-08-13/florida-s-orange-crop-is-bouncing-back-from-bugs-and-a-hurricane

Note 6. http://www.citrusindustry.net/2017/09/11/what-is-happening-to-the-orange-juice-market/

Note 7. https://www.medium.com/florida-history/the-great-freezes-1894-95-and-the-collapse-of-the-florida-orange-industry-7442e5d75337

Note 8. https://www.nytimes.com/1985/01/23/us/freeze-of-the-century-damages-90-of-the-citrus-crop-in-florida.html

Note 9. https://www.theledger.com/article/LK/20091225/News/608119147/LL/

Note 10. https://www.nytimes.com/2004/08/17/us/hurricane-charley-agriculture-hurricane-badly-hurt-florida-crops.html

Note 11. http://www.orlandosentinel.com/business/os-cfb-nsf-florida-citrus-season-worst-20180614-story.html

Note 12. For example, take the case of Kraft cheese.

Note 13. https://www.sciencedaily.com/releases/2018/03/180326140209.htm

Note 14. http://www.flcitrusmutual.com/industry-issues/weather/freeze_timeline.aspx

Note 15. https://www.tropicana.com/our-story

Note 16. https://www.thedailymeal.com/drink/9-things-you-didn-t-know-about-tropicana

Note 17. http://www.fundinguniverse.com/company-histories/tropicana-products-inc-history/

Note 18. https://www.minutemaid.com/history/

Note 19. https://www.floridasnatural.com/who-we-are/

Note 20. https://www.revolvy.com/page/Simply-Orange-Juice-Company

Note 21. W are grateful to Austin Elkins of IT dept., Northern Ky University fot technical assistance.

Note 22. This data is from food stores with sales of over $ 2 million, and drug stores over $ 1 million; it also includes discount stores, such as Target and K-Mart, but *excludes* Wal-Mart as well as warehouse clubs, e.g., Sam's Club, Costco, and BJ's. It also does not include the "dollar" stores, such as Dollar General, and others.

Note 23. For those stores for which, during a week, there were feature ads, coupon ads, display, or temporary price decrease of at least 5%.

Note 24. The six classes are: "The Poor", "The Near Poor", "Traditional Middle Class", "The Upper-Middle Class", "The Very Rich/The Rich", and "The Mega Rich—Masters of the Universe".

Note 25. Of the 32 brands in Table 1, only six were 59-oz packs, and 26 were 64-oz packs. Since the two sizes are pretty close to each other, we have treated them as a single group.

Note 26. Sales of 59 oz included with sales of 64 oz.

Note 27. http://www.pepsico.com/Investors/Annual-Reports-and-Proxy-Information

Note 28. https://www.coca-colacompany.com/content/dam/journey/us/en/private/fileassets/pdf/2018/2017-10K.pdf

Note 29. Businesses with sale of over $ 1 Million.